

# **ARMY GROUND-ACCIDENT REPORT** **COUNTERMEASURE**

Volume 17 Number 10

October 1996

## **TASK FORCE**

### **XXI**

**W**hen the soldiers of Task Force XXI depart Fort Hood for the National Training Center in March of next year—risk management will go with them.

# Protecting the force through risk management

**G**rowing out of a concept of Force XXI, Task Force XXI is a living, breathing, on-the-ground force at Fort Hood, TX. In March of 1997, Task Force XXI will move out with its soldiers, ground equipment, and aircraft for a 14-day advanced warfighting experiment (AWE) at the National Training Center (NTC).

Task Force XXI, which is the 1st Brigade of the 4th Infantry Division (ID), comprises an armor, field artillery, mechanized infantry, light infantry (attached from Fort Lewis, WA), engineer, and forward support battalion as well as an aviation task force. Task Force XXI is an experimental force (EXFOR) that will try out 105 initiatives ranging from the way a brigade in the 21st century is structured to new equipment.

## Structure

One of the initiatives that will be under scrutiny is called combat service support redesign. In Task Force XXI, all combat service support for the armor and infantry — from medics, to fuel, to

food — will be consolidated in a forward support battalion. Where the armor battalion commander used to have his own refuelers, cooks, and other support, in the Task Force XXI brigade model he must go to the support battalion for his slice of these support services.

## Equipment

Many of the initiatives for Task Force XXI involve new equipment. The infantry will take the newest Bradley fighting vehicle, the M2A3, to the NTC. In the artillery battalion, the new Bradley FIST vehicle will be working with the M109A6 Paladin howitzers.

The task force armor battalion will have M1A1s. The task force will also be equipped with the latest night vision equipment.

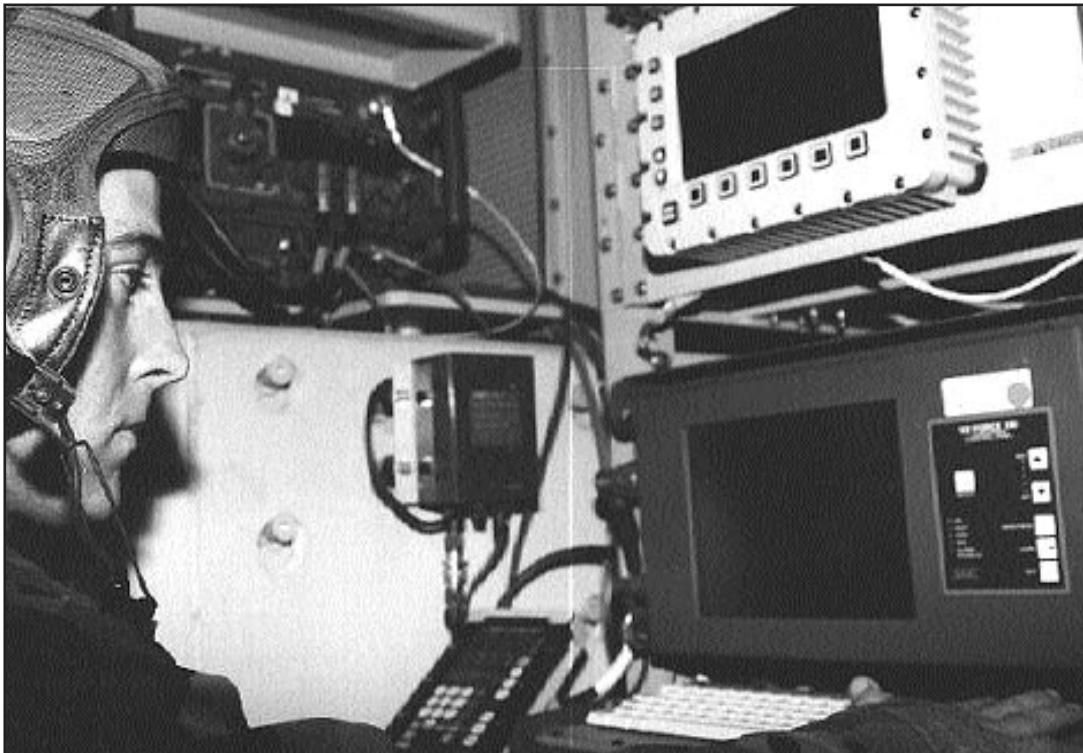
The aviation task force is so designated because some of the aircraft will come from outside the 4th ID. The only two Longbow Apaches in the Army will be part of the aviation task force, and the Texas Army National Guard

with their Chinooks will provide lift capabilities. Scouts will come from the 1st Cav (located at Hood, but not part of the 4th ID). Observation and attack aircraft will come from the 1-4 and 2-4 Aviation, 4th ID.

## Integrating risk management into Task Force XXI

In January of 1996, BG Thomas J. Konitzer, Director of

John T. Love II 4ID PAC



This Task Force XXI soldier is manning the Appliqué computer network site in the rear of a C<sup>2</sup>V (command and control) vehicle. Built from the ground up for the task force, this mobile command system provides the commander with detailed battlefield information.

Army Safety, took a Safety Center team to Fort Hood to brief MG Robert S. Coffey, then 4th Infantry Division Commander, and COL Tom Metz, Chief of the EXFOR Coordination Cell (ECC), on an initiative to integrate risk management into the Army's decision-making processes. If approved, it would become one of the Task Force XXI initiatives. General Coffey and Colonel Metz agreed with the initiative, and it was submitted to the EXFOR Working Group at Training and Doctrine Command. With the EXFOR Working Group's approval, integrating risk management into the military decision-making processes became a Task Force XXI initiative.

In response to a request from COL Tom Goedkoop, Task Force XXI Commander, the Safety Center conducted an assessment of the protect-the-force (safety) status of the Task Force XXI units at Fort Hood in April 1996. The purpose of the assessment was not to see how well the task force had integrated risk management into its operations; it was an across-the-board assessment to help them see where they were on protecting the force. It included such things as driving, firing, and other day-to-day activities that go on in a unit, and it was tailored toward the NTC. The Safety Center was there by invitation in a strictly advisory role to help the commander conduct an assessment of force protection (safety) and risk-management areas to sustain and improve before taking the task force to the NTC.

### Developing tools

During the outbrief, the task force commander asked that the Safety Center develop a risk-management training support package (TSP) for his units.

In response to that request, the Safety Center team developed a Task Force XXI risk-management pocket card for commanders and staffs and a risk-management booklet for small-unit leaders: company commanders, first sergeants, platoon leaders, and platoon sergeants. The Safety Center also developed training support packages for

## FORCE XXI Protection

### Commander and Staff Risk Management



AUGUST 1996 - Prototype



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### Operational Framework

"Historically, more casualties occur in combat due to accidents than from enemy action."

*FM 25-101, September 1990*

Safety is a component of protection.

*FM 100-5, June 1993*

Protect the force: an objective of FORCE XXI.

*FORCE XXI - America's Army for the Future, January 1995*

"Risk management is the Army's principal risk-reduction process to protect the force. Our goal is to make risk management a routine part of planning and executing operational missions."

*Chief of Staff, Army, July 1995*

"This reference card is one of several risk-management tools to assist in identifying and controlling hazards. The Chief of Staff, Army and I expect commanders, leaders, and individuals to use these tools as aids in exercising responsible judgment to protect the force."

*Director of Army Safety, April 1996*

## FORCE XXI

### Small Unit Risk Management Booklet

July 10 1996 - Prototype



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Shown above are two of the risk-management tools developed by the Army Safety Center and tailored to Task Force XXI units.



both platoon-level leaders and soldiers.

To assist the task force in conducting its own assessment in the future, the Safety Center developed a self-assessment booklet, specifically tailored to Task Force XXI units. Task force safety personnel were trained on the self-assessment in July, and in September, the task force conducted its own assessment of Task Force XXI units. This assessment was to tell them where they were on protecting the force, compared to the initial assessment conducted by the Safety Center in April.

During development these products were coordinated with the task force and their changes were incorporated into a version delivered to Fort Hood in early July. Although the products were tailored for Task Force XXI, they can be used Armywide (see box for how to request).

In late August, the Safety Center conducted a protect-the-force safety assessment of the 1-5 Infantry at Fort Lewis. With that completed, every unit in the task force has undergone an assessment. This light infantry battalion will move to Fort Hood in November to join the rest of Task Force XXI.

The next step will be when the Safety Center team returns to Fort Hood to train members of the 2d Brigade, 4th ID, as observer/controllers. Members of this unit will observe the task force during their trainup at Fort Hood.

On 30 September, the Safety Center sent a small team to the NTC to train their observer/controllers. This training was two-fold: risk management and how to assess the task force's integration of risk management into the decision-making processes.

### What does this mean to you?

If the Task Force XXI AWE is successful, this will become the model for an Army brigade and how it will function in a battlefield environment in the 21st century. Sooner or later, all of the Army will go to this same model. If that happens, it will be a safer and more effective force because risk management will be integrated into the Army's decision-making processes. Whether you are now or will be a leader, that means you will be better

tipped to use the risk-management process to identify hazards and develop/implement controls to protect the force.

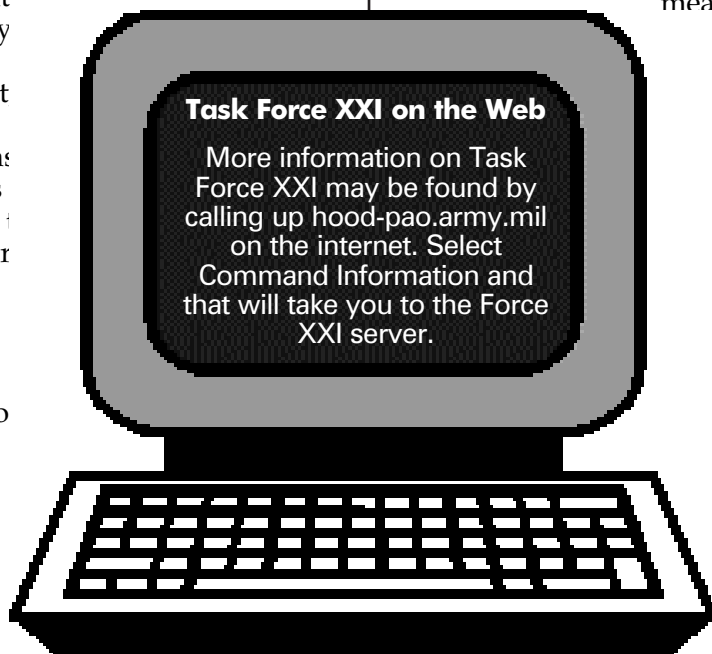
### The road to the future

The EXFOR risk-management initiative also includes Division I. The Safety Center has initiated coordination that will allow the Task Force XXI initiative of integrating risk management into the military decision-making processes to be carried to the division level.

Coordination has also been initiated to use the Battle Command Training Program and the Prairie Warrior '97 exercise to develop risk-management tools, techniques, and procedures appropriate for division-level operations.

Even beyond this is integration of risk management at corps and joint-service levels. Already the military services—Army, Air Force, Navy, and Marines—are sharing risk-management experience and information. In the 21st century, protecting the force should mean *all of the force*. ♦

**POC: MAJ John R. Hefner, Chief, Integration Division, DSN 558-2450 (334-255-2450)**



## How to Obtain Tools

**T**o obtain a copy of the tools developed for chain-teaching risk management and conducting self-assessment, call Ms. Theresa

Wright, Integration Division, DSN 558-2377 (334-255-2377). Local reproduction of these products is encouraged. ♦

# Safety Alert Message

## High-risk behavior

**E**merging insights from the Navy's recent series of aviation incidents show that a number of these were attributed to human error on the part of individuals who had a record of previous mishaps. The Army family can gain some insights from these unfortunate events. This message is intended to raise leader awareness of the hazards associated with soldier indiscipline and improper crew selection for Army ground and air systems.

Human factors account for 80 percent of Army accidents. Those accidents involving "individual failure," an element of human factors, means that a soldier chose to disregard an established standard to which he or she was trained. Examples include the OH-58 crew that crashed while attempting a loop; the HMMWV driver who rolled his vehicle when he elected to drive in excess of established speed limits under limited visibility; the M1 commander who refused to listen to his driver, which resulted in the tank rolling over in a ditch; or the CH-47 crew that struck wires while flying low level down a river. These very serious accidents are examples of the worst-case effects of indiscipline. Fortunately, they do not happen often.

Studies show that in many of these accidents other soldiers or the chain of command knew of the high-risk behavior associated with indiscipline before the accident occurred, but no action was taken.

Today's environment of high operational pace, personnel turnover, and fewer resources requires that commanders be more vigilant of indicators of high-risk behavior among their soldiers. These indicators include previous accidents, traffic violations, DUI, spouse or child abuse, drug or alcohol history, disciplinary offenses, criminal offenses, AWOL, and poor work record. Other less obvious indicators can include marital strife, frequent family separations, accident proneness, financial problems, and high overall stress levels.

Commanders are encouraged to establish both formal and informal processes to capture the indicators of

individual and crew high-risk behavior. For example, most aviation units have a formal "pilot-in-command board." The board consists of the unit commander, an instructor pilot, a safety officer, another pilot-in-command, and perhaps a flight surgeon who evaluate a candidate for pilot-in-command status. In some ground units, a board consists of the unit commander, a senior noncommissioned officer, a master driver, and a safety officer. This group evaluates drivers and crews for evidence of requisite training, maturity, judgment, and the ability to perform the unit's mission. At each of these reviews, the board should watch for the indicators of indiscipline that may develop after a soldier is placed in a crew status.

The bottom line is for leaders to know their soldiers. This can best be accomplished by applying the risk-management process. Start by identifying these behavioral indicators (the hazards) that occur both on and off duty. Then implement controls—for example, additional training, performance review boards, counseling—to mitigate the risks. ♦

**POC: CW5 Robert A. Brooks, USASC Product Development Branch, DSN 558-3969 (334-255-3969)**

### Recap of FY96 Safety Alert Messages

The Army Safety Center issued the following Army safety alert messages in FY 96. Contact your installation safety office for copies.

161532Z	Oct 95	M1A1/M1A2 Abrams Tank
161543Z	Oct 95	G/VLLD, AN/TVQ-2
171558Z	Oct 95	M939 Accident Awareness
062143Z	Dec 95	OH-58D(I) Autorotations
151951Z	Dec 95	MOUT Training
211324Z	Dec 95	POV Fatalities
301711Z	Jan 96	M1A1 Tank Turret Fatalities
051503Z	Feb 96	Civilian Accident Prevention
141814Z	Feb 96	Civilian Accident Prevention—Injury Reporting
291423Z	Feb 96	AH-64 Ground Fire
181832Z	Mar 96	UH-60 Blade Strike Fatality
191910Z	Mar 96	Parachute Fatality
091312Z	May 96	High-Risk Behavior
201506Z	May 96	Accident-Site Hazardous Materials
041835Z	Jun 96	Task Overload and Loss of Situational Awareness
111935Z	Jul 96	Lightning-Strike Awareness (e-mail)
061356Z	Aug 96	Use of Flak Jackets and Compliance With Minimum Safe-Distance Requirements
141306Z	Aug 96	Entanglement Hazards Associated With Load-Bearing Equipment In Airborne Operations
201353Z	Aug 96	Military Driver Selection/Training/Incentives
111846Z	Sep 96	Seatbelt Usage

# Soldiering in cyberspace

*At a conference in San Antonio earlier this year, BG Thomas J. Konitzer, Director of Army Safety, asked MACOM safety directors to propose units to field test the Automated Risk Assessment and Controls (ARAC) for POV Operations. The test programs were sent to selected units in July, accompanied by an assessment sheet for their comments. The response from these units will help the Safety Center identify "bugs" and make improvements in the program before making it available Armywide.*

**T**oday's soldiers probably spent a lot of their growing-up years in video arcades or at a computer keyboard, playing video games. And more and more soldiers are spending at least part of their work days at some kind of computer, either on a weapons system or in an office. In a survey of military personnel about a year ago, the Army Research Institute found that 96 percent of officers and 60 percent of enlisted personnel have access to a PC, either at home or at work. So sitting down at a computer and going through the Automated Risk Assessment and Control (ARAC) program for privately owned vehicle operations will be simple for most soldiers.

## Why do we need ARAC?

Privately owned vehicle (POV) accidents are the number one killer of soldiers; that's a shocking fact. In spite of the good commanders and NCOs, who are out there doing everything they can think of to prevent these accidents, they just keep happening. Clearly something more had to be done.

The first step was formation of a research team from the

Army Safety Center and the Army Warfighting Center at Fort Rucker, AL. The team—which included safety personnel, senior officers, and NCOs—studied accident data and developed five accident profiles of the most common types of driver-error accidents that happened in FY 93 and 94 (see page 8). Then they developed the Automated Risk Assessment and Control (ARAC) Options Program for Privately Owned Vehicle Operations.

ARAC is a computer-based program that will help soldiers identify hazards, estimate their individual risk of having an accident, and choose controls that will lower that risk.

## Soldier friendly

ARAC is easy to use. A soldier sits down at a computer, enters information about him or herself, driving habits, and driving history (see box below). Based on this information, the computer calculates the probability/risk that the soldier will have one of the five most common types of POV driver-error accidents.

After the computer calculates the soldier's risk without controls, it will offer a list of control options. These are suggestions or solutions, which were developed by the research team, to lower the soldier's risk of having an accident. The team reviewed research literature, existing programs and tools, and solicited field input to develop these controls. In addition to being included in the ARAC computer program, these

controls (see sidebar, page 7) are described in detail in the hard copy "POV Force Protection (Risk Management) Toolbox" that will accompany the ARAC when it is fielded.

## ARAC POV Info

- Driver information
- Vehicle information
- When driving occurs
- Where driving occurs and typical conditions
- Holiday, leave, and pass driving
- Driving habits
- Driving history



As the soldier selects controls, the risk is lowered, and the computer displays the residual risk of having each of the five types of fatal POV accidents.

If the soldier wants to further reduce risk, ARAC will again present each control that was not previously selected and give the soldier another chance to select it if he or she wants to.

The controls presented in the program don't mean that it is impossible to have an accident. There will always be some risk when soldiers drive their vehicles regardless of the controls used. But the risk can be significantly reduced.

### The computer isn't a snitch

If, at this point, you're thinking "Wait a minute, I tell this computer all about where, when, and how I drive and all about my bad habits and tickets I've got, and somebody gets hold of it, then what?" Not to worry. When you start using the program, you do have to enter your name (or make one up), but when you're finished, you can delete your name and nobody is the wiser. This

program isn't an electronic snitch, ARAC is designed to tell you things about yourself and your driving that you may not have realized before. You may think of yourself as a pretty good driver, but when all the factors are combined and weighed, you may find that one of those soldiers who died in a POV accident during FY 93 and 94 was a lot like you.

### Other uses

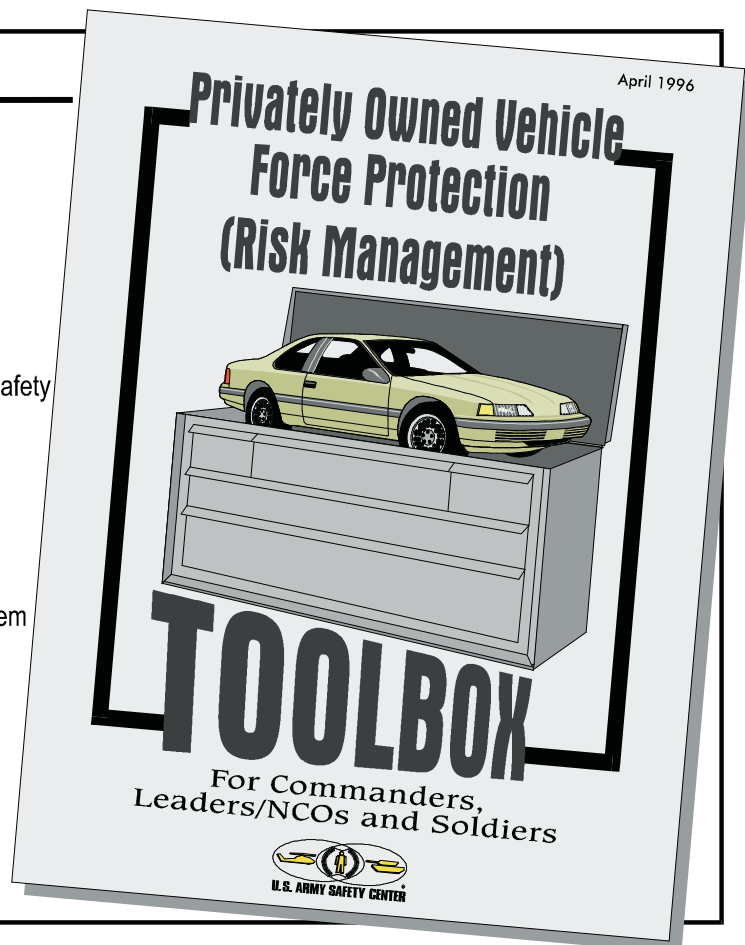
ARAC provides commanders, leaders, and individuals a toolbox of ideas and control options (instant expertise) from which to choose. They can also come up with their own controls to fit their particular unit situation.

Nintendo and other computer games are as familiar to today's soldiers as GI Joe was to their dads. Why not use something that is so familiar to make sure you aren't one of those soldiers who needlessly die every year in POV accidents? ♦

**POC: Ms. Mary Ann Thompson, Research, Analysis, and Studies, DSN 558-3842 (334-255-3842)**

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- Police (MP and local) spotchecks
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- Periodic safety council meetings





## Privately Owned Vehicle (POV) Accident Scenarios

### Profiles of Fatal POV Accidents with Military-Driver Error

#### 1. Young driver, late at night (52% of driver-error cases).

##### Young soldier driving too fast, late at night, while fatigued and/or under the influence of alcohol.

- |                              |                       |                           |                       |
|------------------------------|-----------------------|---------------------------|-----------------------|
| - 66% less than 24 years old | - 81% 2300-0500 hours | - 53% rural road          | - 42% excessive speed |
| - 80% night                  | - 62% summer/fall     | - 56% fatigue/fell asleep | - 34% alcohol         |

##### Example

It was a Thursday night like many others except that 2 soldiers were killed and another injured when their car went out of control and hit a concrete culvert at 100 mph. The driver—a 22-year-old sergeant and two friends—a 23-year-old sergeant and a 21-year-old private, had been drinking into the late hours of the night. They started back to post, probably hurrying because they had to report for duty the next day.

The driver hit the dashboard before being thrown out the rear of the hatchback. The front-seat passenger was also thrown out. The force of the impact threw him out the side window. They died instantly. Although the rear-seat passenger was not thrown out, he was hospitalized for 3 days. None of the soldiers were wearing their seatbelts.

#### 2. Highway day trip (18% of driver-error cases).

##### Soldier on 4-lane/rural road, day trip, for pleasure or return to duty during summer/fall.

- |                         |              |                       |                        |
|-------------------------|--------------|-----------------------|------------------------|
| - 10% Army Reserve      | - 93% day    | - 72% summer/fall     | - 21% improper passing |
| - 89% 4-lane/rural road | - 38% Sunday | - 28% excessive speed | - 14% inattention      |

##### Example

Returning from a day at the beach, a 20-year-old PFC was killed when he was thrown from his car. He was on an interstate when his car drifted to the right. He lost control when he overcorrected. The car rolled and stopped in the median. He was not wearing his seatbelt.

#### 3. Night city driving (12% of driver-error cases).

##### Soldier driving in city at night during summer/fall, going too fast and/or under the influence of alcohol.

- |                  |                    |                       |               |
|------------------|--------------------|-----------------------|---------------|
| - 80% E4-E6      | - 25% on-post      | - 75% night           | - 35% alcohol |
| - 55% motorcycle | - 25% intersection | - 35% Saturday        |               |
| - 90% city       | - 75% summer/fall  | - 45% excessive speed |               |

##### Example

A 30-year-old staff sergeant was killed in a motorcycle accident when she was hit by an oncoming car. She failed to yield the right-of-way and turned left in front of oncoming traffic. One car sideswiped her motorcycle. She was hit by a second car and thrown onto its hood.

#### 4. Too fast for conditions (11% of driver-error cases).

##### Soldier driving on rural road during winter, going too fast for conditions of road (slippery/restricted visibility) or self (fatigue/alcohol), and losing control due to abrupt steering/braking.

- |              |                               |                             |                               |
|--------------|-------------------------------|-----------------------------|-------------------------------|
| - 22% TRADOC | - 67% rural road              | - 39% slippery road         | - 24% alcohol                 |
| - 11% female | - 72% winter                  | - 17% restricted visibility | - 44% abrupt steering/braking |
| - 39% truck  | - 50% too fast for conditions | - 39% fatigue/fell asleep   |                               |

##### Example

A 23-year-old PFC was killed when his car hit a bridge. The soldier, who was on the way home to visit his seriously ill mother, was driving on an icy, wet road when his car went out of control. He was killed instantly.

#### 5. Curves on rural roads (7% of driver-error cases).

##### Soldier driving on Friday after work/at night failed to properly negotiate sharp curve on rural road.

- |                  |                          |                                   |
|------------------|--------------------------|-----------------------------------|
| - 67% FORSCOM    | - 83% rural road         | - 58% Friday                      |
| - 17% female     | - 92% curve              | - 67% improperly negotiated curve |
| - 42% motorcycle | - 42% holiday/leave/pass | - 33% excessive speed             |

##### Example

A soldier was killed when his car hit a culvert and flipped as he was on his way home after work on a Friday. In a rush to be with his family, he took a sharp curve without slowing down and lost control. The car went airborne after hitting the culvert and flipped. It came to rest upside down, crushing the roof.



# Protecting the force in winter

**E**verything becomes more difficult under cold weather conditions. Tasks take longer and require more effort. Fuel freezes. Metal becomes brittle. And a leader's job of protecting soldiers gets tougher.

## Keep soldiers in shape

Soldiers who are in top physical condition have a better chance of survival in cold conditions. Cold-weather clothing is heavy and when added to the normal equipment a soldier must carry can burn up a lot of energy, especially when trudging through mud or snow.

## Eat to keep fit

Soldiers need nutritious, high-calorie, hot food if their bodies are going to have the fuel needed to sustain heat production and protect against lowering of the core body temperature.

## Drink plenty of water

Soldiers may not realize how important water is to their physical condition during cold weather.

Exposure to cold increases the urination rate, which compounds the dehydration commonly seen in the field. Because they don't feel thirsty, soldiers may fail to drink adequate water and become dehydrated. Soldiers should avoid eating snow as a substitute for water because it wastes body heat, irritates the mouth, and may lower the body's core temperature.

## Maintain a positive attitude

Cold weather operations are tough, but so are soldiers. Soldiers watch their leaders, and their attitudes and performance will reflect what they observe. Leaders must watch for early signs of cold stress in their soldiers such as fatigue, lethargy, apathy, irritability, withdrawal, loss of dexterity or decision-making ability, decreased group cooperation, disorientation, or slurred speech. ♦

—Information on cold weather in this issue has been adapted from *Winning in the Winter*, published by the Center for Army Lessons Learned, Fort Leavenworth, KS

## Nutrition Tips for Leaders

- ❑ Ensure soldiers eat all their rations.
- ❑ Allow time for hot meals, which are more satisfying than cold rations.
- ❑ Encourage soldiers to save some snacks (cookies, candy) for between meals and when on the move.
- ❑ Train soldiers to drink plenty of hot liquids, especially non-caffeine liquids such as soups, to prevent dehydration.
- ❑ Ensure stoves are filled each night, and that enough water has been prepared for breakfast. (See Sep 95 issue of *Countermeasure* for tips on stove safety.)
- ❑ When heating water, use all available stoves because this is the most time-consuming operation. Melting and purifying sufficient snow or ice for beverages may take 45 to 60 minutes.
- ❑ When operating the Yukon stove, always use a cooking pot to melt ice or snow. Do not use containers that have been used to store petroleum products or are painted on the inside. Keep canteens and water cans full from this reservoir.
- ❑ Situate areas from which ice or snow will be taken for water production well away from, and up-wind of, latrine and garbage disposal sites.
- ❑ Keep extra snow in a plastic trash bag to minimize trips to gather snow/ice.
- ❑ Discourage soldiers from eating snow or ice; it may reduce body temperature and can result in painful cracking of lips, leading to infection.
- ❑ Train soldiers to refill their canteens regularly, and to carry one canteen close to the body.
- ❑ Don't keep soldiers standing around in the cold. If it is unavoidable, plan to provide hot drinks and snacks, if possible. Use the buddy system to check on the condition of the soldiers. Check soldiers for early stages of cold injury.
- ❑ Prohibit consumption of alcoholic beverages. The perceived warming effects of alcoholic beverages are illusory and are brought about by a quick release of internal body heat through increased circulation of the blood to the surface of the skin. This temporary feeling of warmth is soon lost, leaving the soldier much colder than before. It also promotes dehydration.

# Cold-weather injuries

## Hypothermia

The most dangerous threat to soldiers during cold weather operations is hypothermia. Hypothermia can kill, and it can kill quickly. In fact, it can be a threat even when the weather is relatively mild; for example during extended exposure in thunderstorms, hail, rain, and accompanying winds.

When body temperature drops to 95°F or lower, hypothermia is a danger. A 7° decrease from the body's normal

temperature of 98.6° is life-threatening. If body temperature drops as low as 80°F, death is likely.

■ **Mental signs.** Mental functions are the first to be affected by hypothermia. The soldier's decision-making ability deteriorates. Under hypothermic conditions, his mental responses are slow, improper, or indifferent. He becomes apathetic and lethargic and complains more. There is a noticeable decrease in cooperation in group activities. Speech may be slurred and disorientation can progress to incoherence, irrationality, and even unconsciousness.

■ **Muscular signs.** In the early and moderate stages of hypothermia, soldiers exhibit shivering. Hypothermic soldiers lose fine motor ability, which may cause

them to become too clumsy to walk or stand. They may stumble or fall. In severe cases, shivering ceases, and the soldier exhibits stiffness and inability to move.

Biochemical processes become slow and deficient as the body cools. Unfortunately, early signs and symptoms of hypothermia can be difficult to recognize and may easily go undiagnosed. A soldier may deny he is in trouble; *believe the symptoms, not the victim.*



Signs and Symptoms of Hypothermia

Body Temperature (Degrees Farenheit)	Symptoms	Observable in Others	Felt by Yourself
<b>(Early Stage)</b> 98.6 → 95.0	Intense and uncontrollable shivering; ability to perform complex tasks impaired	Slowing of pace. Intense shivering. Poor coordination.	Fatigue. Uncontrollable fits of shivering. Immobile, fumbling hands.
<b>(Moderate Stage)</b> 95.0 → 91.4	Violent shivering persists, difficulty in speaking, sluggish thinking, amnesia begins to appear.	Stumbling, lurching gait. Thickness of speech. Poor judgment.	Stumbling. Poor articulation. Feeling of deep cold or numbness.
<b>(↓ Severe Stages ↓)</b> 91.4 → 87.8	Shivering decreases; replaced by muscular rigidity and erratic, jerky movements; thinking not clear but maintains posture.	Irrationality, incoherence. Memory lapses, amnesia. Hallucinations. Loss of contact with environment.	Disorientation. Decrease in shivering. Stiffening of muscles. Exhaustion, inability to get up after a rest.
87.8 → 85.2	Victim becomes irrational, loses contact with environment, drifts into stupor; muscular rigidity continues; pulse and respiration slowed.	Blueness of skin. Decreased heart and respiratory rate. Dilation of pupils. Weak or irregular pulse. Stupor.	Blueness of skin. Slow, irregular, or weak pulse. Drowsiness.
85.2 → 78.8	Unconsciousness; does not respond to spoken word; most reflexes cease to function; heartbeat becomes erratic.	Unconsciousness.	
78.8 ↓	Failure of cardiac and respiratory control centers in brain; cardiac fibrillation; probable edema and hemorrhage in lungs; apparent death.		

## Treatment

Leaders and soldiers should understand that prevention of hypothermia is simple – treatment is not. Controls should be instituted to prevent hypothermia or spot soldiers in trouble early. Soldiers suffering early to moderate hypothermia may be rewarmed in the field (see box for treatment procedures).

In severe cases of hypothermia, heart rhythm may be affected. Jarring or bouncing while transporting a patient in the field can trigger abnormal heart rhythm. There may also be complications from an underlying medical condition, wound trauma, and complex disturbances in the body's biochemical balance. For these reasons, **a soldier with severe hypothermia must be rewarmed in a medical treatment facility; immediate evacuation is the proper field treatment.**

During evacuation, further cooling must be prevented. Hot water bottles, canteens filled with hot water, even warmed stones from a campfire can be wrapped in socks or other material and applied to the chest, abdomen, neck, and groin (which contain large blood vessels) to prevent further cooling.

## Frostbite

The extremities (fingers, toes, and ears) are usually affected first by frostbite and suffer the most serious injury. The affected area will be numb. It may tingle or be blistered, swollen, or tender. The skin will be pale, yellowish (grayish in dark-skinned soldiers), and waxy looking. Frozen tissue feels wooden to the touch.

Low temperatures, contact with moisture, and wind chill accelerate heat

### Treatment for Hypothermia

- Body temperature above 90°F (early and moderate)
  - Prevent further heat loss
    - Remove from cold
    - Dry
    - Insulate
  - Actively rewarm
    - Sleeping bags
    - Heat sources
    - Hydrate, hot drinks
- Body temperature below 90°F (severe)
  - Units should not take time to rewarm a severely hypothermic soldier in the field. Immediate evacuation to a medical facility is the proper field treatment.
    - Dry, insulate
    - Prevent further heat loss (apply heat)
    - Monitor ABC (airway-breathing-circulation)
    - Transport/handle gently

loss and increase the likelihood of frostbite.

Soldiers suffering from deep frostbite must be evacuated to a combat support field hospital for proper treatment. No attempt should be made to thaw deeply frostbitten feet before evacuation. Treatment of deep frostbite injuries requires rapid rewarming of the frozen area by immersion in water kept at a

### Contributing Factors to Frostbite

- Cold stress
- Low temperatures
- Wind chill
- Moisture
- Poor insulation
- Contact with supercooled metal or fuel
- Interference with circulation of blood
- Cramped position
- Tight clothing/accessories (gaiters, wristwatch, belt)
- Localized pressure
- Tight-fitting or tightly laced boots
- Dehydration



temperature between 100° and 108°F. This should only be attempted under the supervision of a medical officer. Water colder than 100°F will not thaw deeply frost-bitten areas rapidly. Water hotter than 108°F may burn the patient.

Deep frostbite injuries normally require an extended period of treatment and recovery. There is a strong possibility that deeply frost-bitten soldiers may not return to field duty.

### Immersion foot

Immersion foot results from prolonged exposure, normally in excess of 12 hours, in water at temperatures usually below

50°F. Soldiers can avoid this kind of injury by paying regular attention to their feet—drying them and changing to clean dry socks once a day, or more often if feet get wet. Prevention is simple—but the damage that results if this cold injury is allowed to develop is serious. Recovery is painful and may take weeks. Nerve damage may be permanent and blisters, ulcers, and gangrene are possible. Loss of a foot or lower leg is also possible.

### Treatment

Soldiers suffering from immersion foot should have their feet warmed slowly at

room temperature. In most cases, their feet will be sore. Soldiers should avoid walking on injured feet, and the feet should be elevated to reduce swelling. Bed rest and avoidance of trauma are necessary until the injury heals. You won't have to worry about soldiers with a severe case of immersion foot walking—it hurts too much. These soldiers may be cold-weather casualties for an extended period. ♦

### Immersion Foot

#### ■ Signs and symptoms

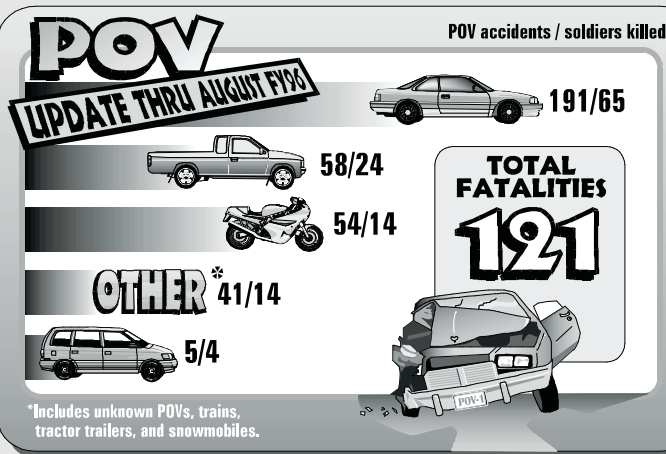
- Cold, streaked or splotched extremity
- Foot feels wooden, numb, pins and needles
- When rewarmed, the foot becomes red, dry, and painful with bounding pulses

#### ■ Prevention

- Change socks as needed to keep feet dry
- Check feet daily
- Sleep with feet warm and dry

#### ■ Treatment

- Remove the feet from the cold, wet environment
- Air-dry
- Do not rub
- Do not constrict the extremity
- Protect the feet from trauma
- Elevate the feet to reduce swelling



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